1. 5.24

2. 5.25

3. 5.26

4. 5.29 (There's a hint in the back.)

5. 5.30 (There's a hint in the back.)

6. 6.3

7. 6.5

8. Let Ω be the unit sphere in three dimensions. Let X be the space of smooth vector-valued functions on Ω that vanish on the boundary of the sphere. We put an inner product on Ω by

$$\langle g, g \rangle = \int_\Omega |g|^2.$$

Let Y be the space of smooth functions on Ω with the L^2 norm. Let $T : X \to Y$ be defined by $Tg = \operatorname{div} g$. Compute T^*.